

Environmental Accounting as a Means of Promoting Sustainable Forestry Operations in Osun State, Nigeria.

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Abstract

Extraction of natural resource is a means of generating revenue outside of Federal Allocations to Osun State. One key area of generating such revenue is through forestry resources. Its indiscriminate extraction could lead to depletion and this may prejudice future generations' access to the resource. This study examines the trend of timber extraction vis-à-vis tree planting to establish the relationship between both phenomena. Results show that while tree planting is declining, tree felling is on the rise with its impacts on earning potentials as well as intergenerational equity. Remediation costs to facilitate livelihoods of local communities and promote sustainability has not been adequate. It was concluded that current practices are not sustainable.

Key Words: Environmental Accounting, Sustainable Development, Forestry Operations

1. Introduction

1.1 Background Information

Desirable as economic development is, it carries with it hidden costs, which may not easily come into view in preparing national income accounts. When considered alongside the concept of sustainable development, its significance becomes apparent. Sustainable Development has been described as development that lasts (The World Bank, 1992). Technically speaking, a cost can be identified with every productive effort. Some are captured by conventional costing systems, others are concealed in overheads and are hardly properly assessed or accounted for (EPA,1995). The ability to assess and account for the proper costs of production will go a long way to promote conservation of natural resource and the environment.

Forest products are natural resources, which have many inherent advantages when viewed from environmental perspective- they are renewable, recyclable, biodegradable and carbon neutral. They are truly sustainable (Bradley, 2001;Olatunji, 2012). This discovery notwithstanding, there is still a need to quantify the environmental implications of their extractions and account for the true costs borne by society for timber extraction (Akande, 2012).

1.2 Statement of the Problem

There is need to evaluate timber operations since the resource is quite significant in the sustenance of Osun State. If not well catered for, it could be depleted. Besides, it takes quite some time to rejuvenate the stock. There is even a grave danger of extinction of certain natural stocks. Furthermore, current increased housing construction has brought about increased wood consumption and hence tree felling. The rate of renewal of the forests may not match the consumption rates.

1.3 Justification for the Study

Developing countries (Nigeria inclusive) face the threats of desertification, deforestation, and problems of all sorts, with attendant poverty arising from environmental degradation (Owolabi, 2001). Conventional costing systems hardly assign values to such activity nor does it report its costs in any manner except as part of overheads. Similarly, public sector accounts also fail to accrue value for it because it is essentially a fund accounting systems.

Furthermore, researchers in environmental accounting tend to focus attention on wasting assets like petroleum, mines, etc. and have focused on the macroeconomic impacts of manufacture, agriculture, industrialization, public projects on pollution control. Not much has been done in assessing the accounting procedures adopted for forestry operations in Nigeria.

Studies in sustainable development and forestry economics paid attention to the need for accounting system which will capture the essence of sustainability by pointing attention to the areas requiring remedial action. This paper attempts to fill this gap and provide basis for further studies.

1.4 Objectives of the Study

The general objective of this study is to evaluate the application of the principles of environmental accounting for the sustenance of timber productions in Osun State.

Specific Objectives are:

- To determine how current practices has promoted sustainable development of forestry in Osun State;
- To evaluate the adoption of environmental accounting to guide decisions relating to timber.

1.5 Research Hypothesis

The hypothesis proposed for this research work is:

H_0 : *Environmental accountability will not positively influence the sustenance of forestry resources and outputs.*

2. Conceptual and Theoretical Framework

We need a clear elucidation on three key concepts in this paper. They are sustainable development, environmental accounting and forestry operations.

2.1 Sustainable Development

Operationally, we cannot talk of sustainable development without considering income accruing and the attendant costs. Similarly, a discussion of environmental accounting must open the reader's understanding to the process of identifying, assessing and reporting environmental issues related to production. Finally, forestry operations includes all activities related to forests, including timber, wild life and other resources. The process of extracting which must elicit some costs, much of which are externalities impacting on the local communities.

World commission on Environment and Development (1987) defines sustainable development, as one which meets the needs of the present without compromising the ability of future generation to meet their own needs. Sustainable development can be expressed in the macroeconomic sense – with reference to national economies, or in the microeconomic sense of firms and households. The developmental efforts of governments tend to leave some after effects such as reduction in life expectancy, ozone layer depletion and so on. The currently reported national income may not be exactly so if the true costs are all integrated into the calculation. The nation could be actually worse off than it would otherwise be. (Hicks, 1946; Daly 1996; El-Serafy and Lutz, 1998; Owolabi, 2001).

2.2 Accounting for Environmental Costs

Environmental Cost Accounting is an integrated approach which examines the inter- relationships between accounting, the environment and management information; decision making and accountability. This is an extension of the scope of conventional accounting to make it include practical environmental and economic implications of the concepts of corporate sustainability and eco-efficiency (Environmental Protection Agency, 1995). Schatlagger and Burrit (2000) identified three key tenets of environmental accounting as achievement of eco-efficiency in production, effective production and equity.

Steele and Powell (2001) recognized that environmental costs may be difficult to measure and thus recommended that in assessing external costs of existing environmental burdens, use monetary values based on how people have reacted to changes in environmental quality, which have already taken place. They further suggested that future organization status should be assessed in terms of its potential impact in monetary terms.

2.3 Nature of Forestry

Forest resources are those resources derivable from forest such as timber, wildlife, and fruits, nuts, medicinal plants and wood fuel. The uses of forests (including vegetative cover) are to prevent erosion, desertification, extinction of wildlife species, the provision of biomass and to serve as tourists' attraction.

Non-timber forest products can play a vital role in food security and income generation. In fact, in most parts of Africa deforestation is an acceptable phenomenon to have forests cleared for agricultural and dwelling home uses.

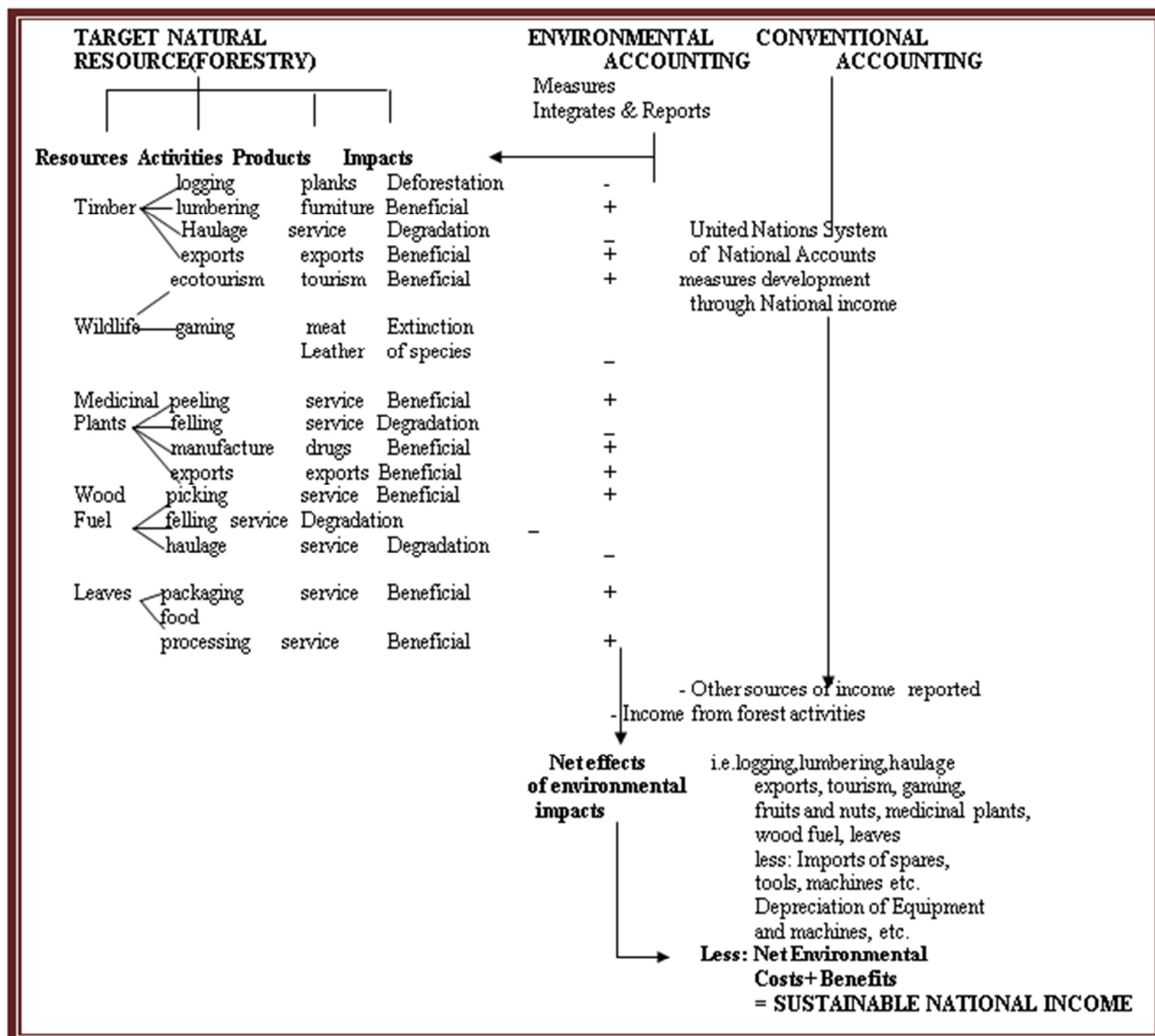
The World Bank in its World Development Report Development and Environment (1992) declares:

...forests provide a wide range of social and ecological functions. They provide livelihood and cultural integrity to forest dwellers and a habitat for a wealth of plants and animals. Forests protect and enrich soils, provide natural regulation of hydrologic cycle, affect local and regional climates through

evaporation, affect water shed flows of surface and groundwater and help to stabilize the global climate by taking up carbon as they grow. Many forests have a larger spiritual significance for those who may never visit them but still cherish the thought of their existence.

The report continued by categorizing the world's forests into three broad types namely, tropical moist and dry forests, temperate forests and degraded forest land. It identifies the tropical moist forest as the main concern for it is fast disappearing. These forests which cover more than 1.5 billion hectares are the richest ecosystem in biomass and biodiversity on land. (The World Bank, 1992, 2003; Muir-Leresche, 1990; Ashbey,1988).

Fig.1 A Conceptual Framework of the Interrelationships Among Forestry Operations, Environmental Accounting and Sustainable Development



Source: Olatunji (2012), Bringing Sustainability to the Fore in Forestry through Environmental Accounting *Global Journal of Management and Research*. P142.

3. Research Methodology

The researcher utilized secondary data for the purpose of the study. The data were obtained from the state annual budgets and its explanations for a ten year period, 2001-2010. Data collected were treated to obtain testable

values and these were subjected to Multiple Regression Analysis using formula, $Y = +a_1X_1 + a_2X_2 + a_3X_3$, then the coefficient of determination R^2 was computed.

The following hypothesis was tested using the F-statistic

H_0 : Environmental Accountability Will Not Positively Influence the Sustenance Of Osun State Forests

- a. Environmental Capital Rent: This refers to amounts charged as royalties for the mining /extraction of natural endowment as compensation for its depletion and the cost of waiting for regeneration by the host community. This is expected to be expended on parallel community development projects.
 - ☐ Regeneration costs: This should not merely be cost of seedlings, land preparation and dressing but also a present value of future costs of bringing up the forest for intergenerational equity.
- b. Opportunity costs of land occupied by forests is catered for by a pool of funds held by the state government as custodian of all rights to land, in trust fund.

The multiple linear regression analysis shall be adopted as follows:

- ☐ Revenue from forestry operations, Y, is the dependant variable
- ☐ Royalties/Capital rent, X_1
- ☐ Regeneration fee X_2
- ☐ Trust fund X_3

Using the formula

$$Y = +a_1X_1 + a_2X_2 + a_3X_3$$

Where is the intercept of the regression line on the y axis

a's are partial regression coefficient associated with each independent variables. The coefficient of determination, R^2 was computed and tested for significance using the F-statistic.

4. Findings

The annual average of tree felling in Osun state is 883,597 cubic feet with a standard deviation of 67,000 cubic feet. The present trend when viewed closely shows a continuing annual growth and at an alarming rate. When a trend line is estimated ($Y' = a + bx$) (see appendix) $Y' = 883,597$ cubic feet at origin between 2005 and 2006 having an annual growth rate of 34,883 cubic feet.

The growth in tree felling rates can be expressed as 34,883 cubic feet / 883,597 cubic feet. This will result at 3.948% or approx. 4% annual growth in tree felling within Osun state. (See appendix).

The average rate of tree planting per annum is put at 72.04 hectares. But the trend shows a continuing decline in tree planting at an annual rate of 2.927 ha. (See appendix for the calculation of the trend. The annual rate of decline is given as $2.7927/72.04 = 3.877\%$. This implies that regeneration is declining at the rate of 3.877% or approx. 3.9% annually.

The tests of hypothesis arising from the regression analysis show that over 52% of revenue generated by the state from forestry was ue from stumpages (as analysed) and at 5% level of significance the F-statistic showed that computed F is less than F by table, thus the alternative hypothesis is upheld. We conclude that environmental accountability does promote sustainability of Osun State forests.

5. Discussion, Recommendations and Conclusions

In Osun state, revenue from forestry is reported under three revenue heads, i.e. Fines and Fees: Stumpages; Licenses and Permits: Sawmills and Hammer; Earnings and Sales: Forest Products. The annual contribution to internal revenues is significant. From our analysis, it was discovered that host communities should have shared about N21 million as royalty for wood stumped from 2001-2010 while about N31.26 million should have accrued to the trust fund held by the state government. Regeneration funds has generated about N72.88 million, which is expected to have been committed for the maintenance of the forests. These are investments in environmental capital in line with the proposition of Thampapillai and Uhlin, (1997).

The rate of tree felling is growing at the rate of 3.95% or 4% while tree planting and regeneration efforts are declining at the rate of 3.887% or 3.9%. This trend has been maintained in the ten years reported and thus a doubled effort is needed for another ten years to arrive at sustainable yield in line with the works of Thampapillai and Uhlin,(1997); Bishop and Woodward, (1999) and (Hussein, 2000).

5.1 Conclusions

The following conclusions were derived from the study:

- Forestry operations exert tremendous impact on the economy as well as ecology of Osun State. Its products and natural resources are quite valuable for sustainable development in Osun State.
- Although it is a well known fact that environmental accountability will enhance the continuity or sustenance of Osun State forests, no definite action was taken to promote such accountability.

5.2 Recommendations

The present practice requires major reforms in the area of accounting for the environmental costs of forestry projects and exploitation, responsible management of forestry resources to promote intergenerational equity, effective forestry policies promoting other stakeholders interests in the forestry business for collaboration and effective audit and monitoring system.

• Environmental Costing of Forestry Projects

This will serve as basis for accruing full costs to each cubic foot of wood felled. The present practice whereby the prices for forestry products are fixed without due regard to costs and economic realities had only furnished the opportunists and speculators with great gains at the expense of sustainable production. (Repetto and Gills, 1988).

• Forestry Management and Income Recognition

Forestry management and income recognition needs to be well defined. The present practice has allowed too many leakages that promotes corruption of field men in collusion with illegal takers and this cause untold distortion on the accounts of state.

• Effective Auditing of Forestry Proceeds

The proceeds of forestry operations, especially stumpages need to be audited in such a manner as to ensure that the various appropriations there from are undertaken as laid down.

• Costs-Benefit Analysis

Willingness to Pay assessment in Cost-Benefit analysis. The efforts of relating costs to benefits will provide an impetus for development of forestry.

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Appendix

I. Rates of Trees Felling

YEAR	TREES FELLED IN CUBIC FT (X)	X ²
2001	731,193	.5346
2002	342,586	1,174
2003	563,631	0.31776
2004	993,139	0.9860
2005	912,720	0.8340
2006	1,035,724	1.0733
2007	968,152	0.93
2008	1,080,811	1.1664
2009	1,008,118	1.0040
2010	1,200,000	1.440
Total	8,835,974	8.4104
Mean	883,597.4	
Standard deviation	67,000	

Source: Researcher's Calculation Based on Data from Forestry Department

II. Rates of Regeneration of Trees (in Hectares)

Year	Trees Grown (In Hectares)	X ²
2001	110.4	.5346
2002	115.0	1.174
2003	83.0	0.3176
2004	70.0	0.9860
2005	64.0	0.8340
2006	41.0	1.0733
2007	32.0	0.93
2008	66.0	1.1664
2009	62.0	1.0040
2010	75.0	1.440
Total	720.4	8.4104
Mean	72.04	

Source: Researcher's Calculation Based on Data from Forestry Department

III. Analysis of Stumpage Fees

YEARS	ROYALTIES (1/6) N'm	REGENERATION (7/12)N'm	TRUSTFUND (1/4)N'm	STUMPAGE FEES N'm
2001	0.49450	1.73075	0.74175	2.9670
2002	0.59930	2.09755	0.89895	3.5958
2003	1.40570	4.91995	2.10855	8.4342
2004	1.35012	4.72541	2.02517	8.1007
2005	2.86085	10.01297	4.29128	17.1651
2006	2.65652	9.29781	3.98477	15.9391
2007	2.72388	9.53359	4.08582	16.3433
2008	1.52395	5.33259	2.28593	9.1437
2009	4.12757	14.44648	6.19135	24.7654
2010	3.08050	10.78175	4.62075	18.4830
TOTAL	20.82289	72.88008	31.20432	124.9072

Source: Researcher's analysis of Stumpage Fees

IV. DATA FOR MULTIPLE REGRESSION ANALYSIS

YEARS	ROYALTIES (1/6) N'm X1	REGENERATION (7/12)N'm X2	TRUSTFUND (1/4)N'm X3	STUMPAGE FEES N'm (Y)
2001	0.49450	1.73075	0.74175	3.5525
2002	0.59930	2.09755	0.89895	4.0505
2003	1.40570	4.91995	2.10855	30.0709
2004	1.35012	4.72541	2.02517	13.8779
2005	2.86085	10.01297	4.29128	52.2184
2006	2.65652	9.29781	3.98477	63.2813
2007	2.72388	9.53359	4.08582	48.4648
2008	1.52395	5.33259	2.28593	41.8816
2009	4.12757	14.44648	6.19135	38.7813
2010	3.08050	10.78175	4.62075	25.0217
TOTAL	20.82289	72.88008	31.20432	321.2009
MEAN	2.08229	7.28801	3.12043	32.12009

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